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Data Sources and Methods for the Drinking Water Advisories in Canada Indicator

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Canada

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1 Introduction

The Drinking Water Advisories in Canada indicator (http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=2C75C17A-1) is part of the Canadian Environmental Sustainability Indicators (CESI) (http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1) program, which provides data and information to track Canada's performance on key environmental sustainability issues. This indicator also measures progress towards the goals and targets of the Federal Sustainable Development Strategy (http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1).

2 Description and rationale of the Drinking Water Advisories in Canada indicator

2.1 Description

The Drinking Water Advisories in Canada indicator provides a long-term view of the main reasons why boil water advisories are issued, namely:

1. due to the detection of *Escherichia coli* (*E. coli*), which suggests the possible presence of disease-causing organisms in drinking water;
2. on a precautionary basis due to elevated levels of other, non-health-related water quality indicators; and
3. on a precautionary basis due to equipment and process related issues.

It also reports on how community size influences the percentage of boil water advisories issued in each year. Rarely used Do not consume and Do not use advisories are not included in this indicator.

2.2 Rationale

Although Canada's drinking water is among the safest in the world,[1] improved understanding of key trends related to drinking water advisories helps identify priorities for drinking water infrastructure and operations in Canada. This information helps foster consistency and coordination of efforts to support enhanced drinking water safety and the sustainability of drinking water infrastructure across the country.

The Canadian Network for Public Health Intelligence (CNPHI) provides a suite of secure surveillance and alerting applications for use by federal, provincial and territorial health protection agencies. The CNPHI Drinking Water Advisories application (DWA) has been created to meet the needs of the agencies responsible for overseeing the safety of drinking water. The DWA helps them to manage and share information to coordinate response efforts during a drinking water incident, and helps to capture, analyze and report on the context of drinking water advisories so that lessons can be learned and priorities identified.

In Canada, the lead responsibility for overseeing the safety of drinking water lies with provincial and territorial governments. Drinking water advisory data are generated by

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[1] World Health Organization (2009) Country profile of Environmental Burden of Disease: Canada. WHO Data and Statistics. Retrieved on 28 February, 2014. Available from: http://www.who.int/quantifying_ehimpacts/national/countryprofile/en/#C.

regulatory agencies as the advisories are issued. When a drinking water advisory is issued, the DWA application helps the regulatory agency quickly communicate the advisory to personnel at the local and regional level while capturing key information describing the incident. The system can help agencies communicate information to the public quickly and allows for analysis of accumulated drinking water advisory data to reveal key trends such as water quality or operational reasons for the advisories and the characteristics of the drinking water systems or communities affected.

3 Data

3.1 Data source

Data for this indicator originate from agencies using the CNPHI DWA application and were drawn from the database.

3.2 Spatial coverage

Data used in this indicator originate from a variety of agencies and jurisdictions across Canada. Given this is a relatively new surveillance tool, the data do not yet represent all jurisdictions. However, the results are representative of key drinking water needs and issues in Canada.

3.3 Temporal coverage

Data for this indicator span from January 1, 2010 to December 31, 2013.

3.4 Data completeness

Data included in this indicator represent all boil water advisories issued by participating jurisdictions and agencies from 2010 to 2013 that are included in the DWA.

3.5 Data timeliness

While the indicator is reported annually, data are contributed to the DWA by participating agencies when the advisories are issued, or shortly after. The Drinking Water Advisories in Canada indicator is calculated using the most recent data available at the time of the production of the indicator. As new agencies begin to use the DWA, they may choose to add historic data to the system. In such cases, the older data are included in the appropriate year in the indicator chart.

4 Methods

The Drinking Water Advisories in Canada indicator focuses on boil water advisories as they are the most common type of drinking water advisory and represent the vast majority of the data. "Do not consume" and "Do not use" advisories, representing approximately 2% of advisories each year, are not included in the indicator. "Do not consume" and "Do not use" advisories may be issued in response to operational issues or when a chemical contaminant is suspected, or confirmed, in the drinking water system. Also, they may be issued when conditions would otherwise call for a boil water advisory but where boiling is not practical, such as at school water fountains. Given the variation in their use and the rarity of "Do not consume" and "Do not use" advisories, they are excluded from the indicator. Boil water advisories can be

considered representative of the general situation in Canada with respect to drinking water advisories.

The reasons that boil water advisories were issued are categorized into three categories: Water Quality - *E. coli*; Water Quality - Other microbiological parameters; and Equipment and Process. These categories represent a consolidation of the broad array of more detailed water quality reasons captured by the DWA application (Table 1). Figure 1 shows how all individual DWA water quality reasons contributed to the issuance of boil water advisories.

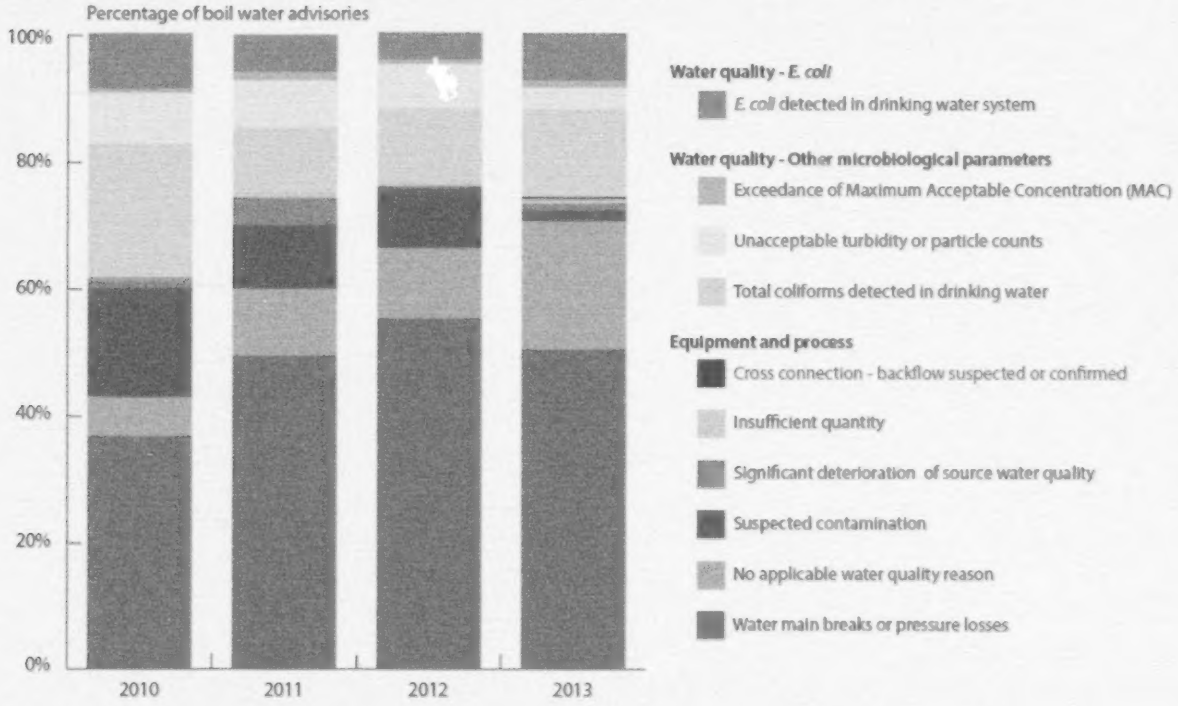
To calculate the indicator for each year, all boil water advisories in the DWA were categorized and the total number of boil water advisories in each category were summed and divided by the total number of boil water advisories captured by the DWA.

Table 1. How DWA reasons were grouped for the indicator

Reason	Definition	Indicator Category
***E. coli* detected in drinking water system**	The chief bacterial indicator of drinking water safety. Its presence indicates recent fecal contamination and the possible presence of disease-causing micro-organisms in drinking water.	Water Quality - *E. coli*
Unacceptable turbidity or particle counts	A measure of the cloudiness of water caused by suspended particles. Provides information on the effectiveness of treatment and helps identify changing conditions in the drinking water system.	Water Quality - Other microbiological parameters
Total coliforms detected in drinking water system	Common environmental bacteria used to assess general conditions within the drinking water system. Also provides information on the effectiveness of treatment.	Water Quality - Other microbiological parameters
Exceedance of Maximum Acceptable Concentration (MAC)	Used in instances when the MAC of a contaminant has been exceeded.	Water Quality - Other microbiological parameters
Water main breaks or pressure losses	Includes instances when distribution system pipes break resulting in a breach of integrity, leakage and loss of system pressure. This category also includes system pressure losses due to maintenance work, power failures or depleted reservoir storage.	Equipment and Process
Suspected contamination	Used when contamination is suspected due to observed operational conditions, not test results.	Equipment and Process
No applicable water quality reason	Used in cases when an advisory is issued solely for operational reasons with no observed water quality issues.	Equipment and Process
Insufficient quantity	Used in cases when the capacity of water storage is depleted resulting in a	Equipment and Process

Reason	Definition	Indicator Category
	potential loss of pressure in the drinking water system.	
Significant deterioration of source water quality	Used in instances when a decline in source water quality has potentially impacted drinking water quality.	Equipment and Process
Cross-connection: backflow suspected or confirmed	Applies to inappropriate connections to a drinking water system resulting in potential contamination of drinking water.	Equipment and Process

Figure 1. The percentage of boil water advisories by DWA water quality reasons, Canada, 2010 to 2013



5 Caveats and limitations

The CNPHI Drinking Water Advisories DWA application is a national asset developed and enhanced over time through partnerships and collaborative work involving federal, provincial and territorial partners. The front line users of the system are the regulatory agencies who oversee drinking water safety. The data on the system belong to them as they have created it in the course of their oversight activities.

The DWA became a live surveillance and alerting application in 2008. The pace at which data will approach the national scale will be dependent on how the growing number of partner

agencies adopt and implement the system. The number of agencies using the system is growing each year and the end goal for the Drinking Water Advisories in Canada Indicator is to represent the full national picture. Although this is not yet the case, the data are representative of prevailing trends in a variety of regions across Canada, and provide useful insight into issues that challenge the delivery of safe drinking water.

The Drinking Water Advisories in Canada indicator presents an overall view of the trends emerging in the system and does not focus on the specific data for any particular province, territory or agency. It is important to note that percentages reported in this report may differ from previous and future reports as historic data are added to the system and as adoption of the DWA expands to new agencies.

6 References and further reading

6.1 References

Health Canada (2009) Guidance on issuing and rescinding boil water advisories. Retrieved on 20 December, 2013. Available from: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/boil_water-eau_ebullition/index-eng.php.

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6.2 Further reading

Health Canada (2012) Guidelines for Canadian Drinking Water Quality: Guideline Technical Document - *Escherichia coli*. Available from: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/escherichia_coli/index-eng.php.

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Additional information can be obtained at:
Environment Canada
Inquiry Centre
10 Wellington Street, 23rd Floor
Gatineau, QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
Email: Enviroinfo@ec.gc.ca